

**Authority for Budget (AFB) Supporting Documentation
Plant, Yard and Road Repairs
Northern California Power Agency**

Current Situation and Need

We are requesting that \$250,000 be budgeted for the GEO to do road repairs at the facility. We plan on asphaltting and resurfacing on portions of well pad access roads, the main easement road as well as some plant asphalt work. In FY 16&17, much of the Plant I Yard was patched and will be resurfaced this spring. In addition, numerous asphalt patches were completed on many of the roads in the Steamfield.

Alternatives Evaluated

1. Work on the sections of roads that require resealing, hot-patching and resurfacing.
2. Do nothing and allow the roads to deteriorate and spend additional money in the future to bring them back up to standards and safe to drive.

Alternative Selected

Invest in the roads now and do not let them deteriorate to the point that there is a safety issue and it costs more money in the future to bring them back up to standards.

Financial Analysis

This was considered a mandatory project to maintain the roads at the GEO in a safe operating condition. The cost for the repairs is estimated to be \$250,000.

Non-Financial Benefits

For the safety of the people driving the roads at the GEO

Recommendation

Staff recommends the Road Repairs be undertaken in FY 2018.

Authority for Budget (AFB) Supporting Documentation
Wellhead Valve Replacement and Repair
Northern California Power Agency

Current Situation and Need

There are 5 production wellhead valves that are in need of replacement and faulty valves sent out for rebuild at the GEO. On some of these valves the use of a packer may be necessary to isolate the steam from the valve in order to safely perform the replacement. The cost of each packer set and retrieval is about \$30,000 and the normal cost of a valve rebuild is about \$20,000. Having properly functioning production and injection well valves is a permit requirement. There are approximately 160 Wellhead Valves at the Facility which are on a 30 year rebuild cycle.

Alternatives Evaluated

1. Replace the valves that are not functioning correctly and have them rebuilt to be sure adequate supplies of valves are on hand at the GEO.
2. Replace the faulty valves and do not have them rebuilt leaving the GEO without an adequate supply of replacement valves in the future. Rebuilding the valves usually takes 2-4 months.
3. Do nothing.

Alternative Selected

1. Replace the valves that are not functioning correctly and have them rebuilt to ensure adequate supplies of valves are on hand at the GEO.

Financial Analysis

This was considered a mandatory project and no economic analysis was done. The cost for the project is estimated to be \$200,000.

Non-Financial Benefits

Having properly functioning valves satisfies permit requirements and enhances the safety of the GEO Staff.

Recommendation

Staff recommends to replace the defective valves and send out faulty ones to be rebuilt to ensure adequate supplies of valves are on hand at the GEO.

**Authority for Budget (AFB) Supporting Documentation
Chemistry Lab Building Maintenance
Northern California Power Agency**

Current Situation and Need

That \$150,000 be budgeted for the repair of the Chemistry Lab. The lab was constructed in the eighties. The roof and siding have greatly deteriorated with time. Although numerous attempts have been made to fix the building, the lab develops leaks during heavy rains. The water leakage presents possible safety hazards to the staff as well as potential damage to lab equipment.

Alternatives Evaluated

1. Repair the Chemistry Lab by re-siding and re-roofing the structure.
2. Do nothing and continue to caulk known leak points throughout the building.

Alternative Selected

The selected alternative is to repair the roof and siding of the Chemistry Lab. Deferring repairs will ultimately result in a higher future cost.

Financial Analysis

For environment, health, and safety reasons this project is considered mandatory and not subject to an economic analysis.

Non-Financial Benefits

The non-financial benefits are the prevention of damage to existing lab equipment and the safety of the staff working in the lab.

Recommendation

Staff recommends the Chemistry Lab Building Repair be undertaken in FY 2018.

Authority for Budget (AFB) Supporting Documentation
Main Steam Piping Modifications
Northern California Power Agency

Current Situation and Need

That \$200,000 is budgeted for modifications to the piping in the steam field. These modifications would primarily be to straighten out the angles in the loops on the steam lines. There is approximately a 10 psig pressure drop between an average steam production well and the turbine inlet. If this could be reduced, there would be an increase in MW production at the facility. These funds will be used to remove some of the unnecessary pipeline loops and steam separators in an effort to minimize the pressure drop and improve plant generation. Once this phase is completed, an additional pressure check will be completed to evaluate the success of the project. If successful, the GEO staff will be requesting an additional \$400,000 in the FY19 Budget to complete the project during that year's Plant 1 Overhaul.

Alternatives Evaluated

1. Modify steam pipelines by removing unnecessary loops and separators.
2. Do nothing.

Alternative Selected

The selected alternative is to modify steam pipelines.

Financial Analysis

Assumptions used for the analysis are:

Project Life	15 years
Capital Investment	\$200,000
Generation Gain	.25 MW annually declining at 2% per year
No project financing	
Price Forecast per Power Settlements	

Economic results are:

NPV @ 5%	\$654,482
IRR	30.5%
Average Annual Benefits	\$71,030
Payback	4 years

Non-Financial Benefits

None

Recommendation

Staff recommends \$200,000 in funds be approved for the modification of production piping in the steam field. If this project proves to be successful, an additional \$400,000 will be requested in FY19 to continue the project during the Plant 1 Overhaul.

Authority for Budget (AFB) Supporting Documentation
Vehicle Replacement
Northern California Power Agency

Current Situation and Need

There is a need to replace older vehicles at the Geothermal Facility as they become unreliable. At present the GEO Facility has four mechanics trucks that were obtained from LEC and Hydro. All of these vehicles have between 130,000 and 160,000 miles on them. Two of the four are two wheel drive units, which are a definite safety concern to drive during our winter months when driving in ice and snow. Our mechanical maintenance crew is extremely dependent on these vehicles for both plant and field work. Two of the four vehicles have had major maintenance performed on them and the third vehicle has suspension issues and is in need of significant repairs. GEO staff believes that it would be more cost effective to purchase a vehicle and put the old one up for sale per the NCPA surplus policy than to try to continue to spend money and time fixing it.

Alternatives Evaluated

1. Replace the older, mechanically unsound vehicle
2. Continue to repair the vehicle costing both money and time

Alternative Selected

• Replace the existing vehicle and put the older vehicle up for sale per the NCPA surplus procedure

Financial Analysis

This was considered a mandatory project to enhance the safety and reliability of the fleet vehicles at the GEO Facility. The cost of this vehicle is estimated at \$90,000.

Non-Financial Benefits

The Safety of the persons driving the vehicle at the GEO

Recommendation

Staff recommends that \$90,000 be budgeted in FY 18 so that a new vehicle can be purchased

Authority for Budget (AFB) Supporting Documentation
Plant 2 Stretford Sulfur Processing Platform
Northern California Power Agency

Current Situation and Need

History: The Stretford system was installed in 1985 when Plant 2 was constructed. The process involves a vacuum filter that dries out the sulfur for shipping. The system was constructed two stories high which allowed for the liquid that was extracted through the vacuum belt to gravity flow back to the tanks. This eliminated the need for a tank and pumps to return the liquid solution up to the slurry tank.

Created concerns: Due to increased elevation the dried sulfur has a greater distance to fall into the dumpster. As the dumpster fills up, the sulfur tends to splatter out creating a dust hazard in the Stretford area. During most of the year, a fire hose with a wide spray is used by operations to help mitigate the dust issues. This condition requires the Operator to use a dust mask for prolonged times while working in the area. The extra height also creates a greater potential for slipping and tripping during inclement weather.

During the FY15 Budget process, \$250,000 was approved to move the processing platform down to the first level. During the engineering design process, it was determined that the processing structure had some significant corrosion that would require substantial repair. With this in mind, it was determined that it would be preferable to build a new single story processing structure and remove the existing structure.

Alternatives Evaluated

1. Do nothing.
2. Replace the filter housing to be more consistent with the Plant 1 Stretford. The Plant 1 filter housing is one story tall, which greatly reduces/eliminates dust hazards and safety concerns. Original plan was to lower the existing structure but upon further analysis, it was realized that there is significant corrosion in that structure and it is preferred to build a new structure. In addition, the engineering firm determined that building a new structure would allow not only better operating conditions but enable the plant to reconfigure the equipment in the structure to have better access for maintenance. This new structure would also place the sulfur bin on the ground instead of a rack eliminating other tripping hazards while racking the sulfur in the bin.

Alternative Selected

1. Build a new filter housing to be more consistent with the Plant 1 Stretford to eliminate the dust and increase the operating efficiency of the Plant.

Financial Analysis

There was no financial analysis done for this project.

Non-Financial Benefits

This project would eliminate the dust hazard in the Stretford and reduce tripping hazards in the tower. It would also increase operational efficiency which is significant with the planned reductions in operations staffing.

Recommendation

Staff recommends replacing the filter housing to be more consistent with the Plant 1 Stretford. The Plant 1 filter housing is one story tall, which greatly reduces/eliminates dust hazards and safety concerns. Original plan was to lower the existing structure, however after reviewing the project with engineering it was determined that building a new structure would allow not only better operating conditions but enable the plant to reconfigure the equipment in the structure to have better access for maintenance. This new structure would also place the sulfur bin on the ground instead of a rack eliminating other tripping hazards while racking the sulfur in the bin.